CEBS: Chemical Effects in Biological Systems – Integrating Biology with Microarray / Proteomics Data

Jennifer Fostel, Ph.D.
CEBS Scientific Administrator
National Center for Toxicogenomics
and Lockheed Martin LMIT ISS

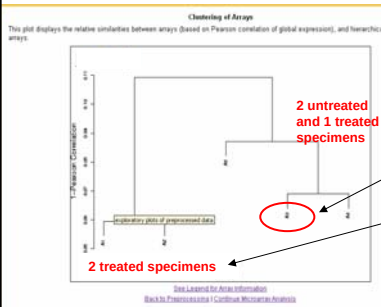
NIEHS
National Institute of Environmental Health Sciences

Example from CEBS v1.6

- TODAY'S DATA: 344/N rats treated with 1500 mg/kg acetaminophen
- Three treated rats + two untreated rats

- TOMORROW'S DATA: CDC CAMDA Chronic Fatigue Syndrome; Wichita Study
- ALL DATA GRATEFULLY ACCEPTED!

Microarray data, 5 rats



unexpectedly, microarray data from one treated rat clusters with data from untreated, not with data from the other treated animals

Legend for Array Information

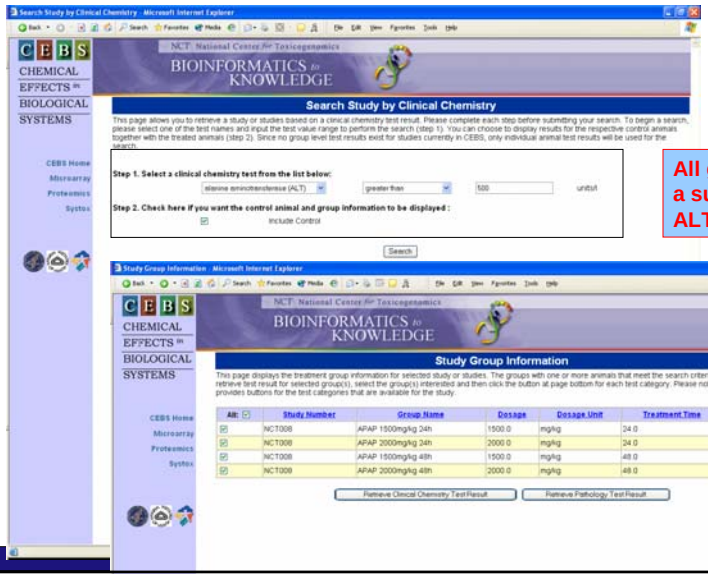
Label	Experiment ID	Array Name	Sample Name
A1	522399544	1500mg_Acetaminophen_24h_Male_Rat_3018_206559593	1500mg_APAP_24hr_3018
A2	522399544	1500mg_Acetaminophen_24h_Male_Rat_3019_206559594	1500mg_APAP_24hr_3019
A3	522399544	1500mg_Acetaminophen_24h_Male_Rat_3020_206559595	1500mg_APAP_24hr_3020
A4	522399544	1500mg_Acetaminophen_24h_Male_Rat_Pool_206771750	1500mg_APAP_24hr_Pool_3012_3013_3014
A5	522399544	1500mg_Acetaminophen_48h_Male_Rat_Pool_206559665	1500mg_APAP_48hr_Pool_3000_3001_3002

Experiment Information

Experiment ID	Title
522399544	Gene Expression Profiling of F344/N Rat Livers After Acute Acetaminophen Exposure

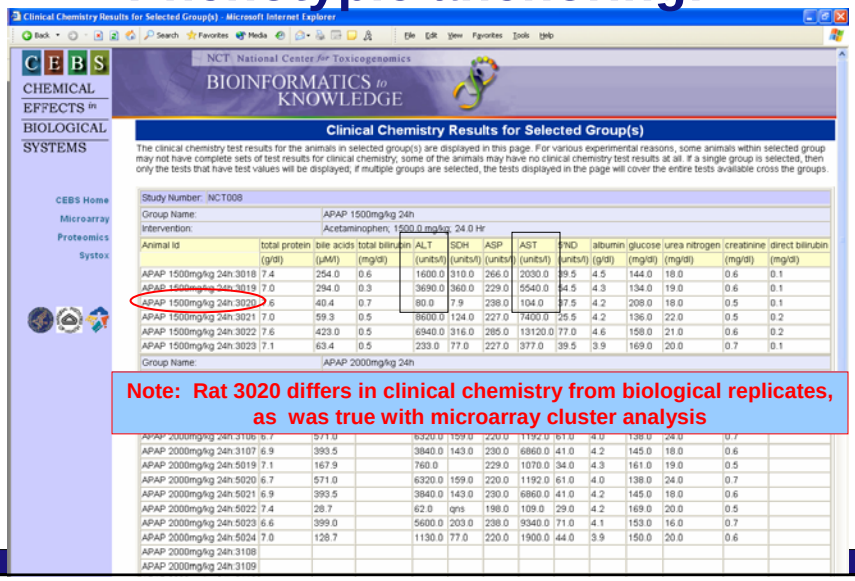
Back to Preprocessing | Continue Microarray Analysis

Look at Clinical Chemistry in CEBS



All groups containing a subject with ALT > 500 units / L

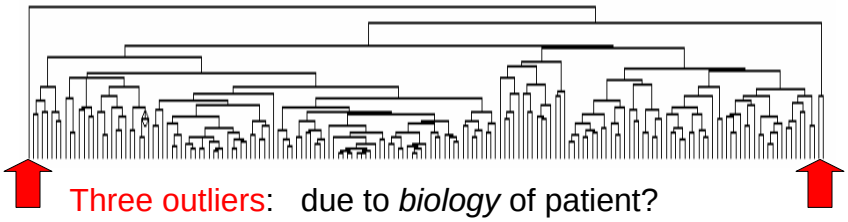
Phenotypic anchoring:



Note: Rat 3020 differs in clinical chemistry from biological replicates, as was true with microarray cluster analysis

How does this help clinical data analysis?

Expression profiles in “apoptosis genes”
used to cluster 173 patients in dataset from the CDC:



Three outliers: due to *biology* of patient?
or *technical* detail in microarray experiment?

Stay tuned..... we are loading the data into CEBS.

- Production CEBS v1.6
  - http:\\cebs.niehs.nih.gov
- Anticipate CEBS v2.0 in December ’05
- ARC = ArrayTrack-research CEBS
  - relational database, integrate biology and phenotype with microarray data
  - loads into ArrayTrack, CEBS (private or pubic)
- CEBS Development Forum
  - http://www.niehs.nih.gov/cebs-df/
- Contact:
  - fostel@niehs.nih.gov